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unravel several of the knots in this intricate problem, and relieve the conclusions of much of their apparent paradoxical character. Be that as it may, Dr. Lombroso's work remains a valuable contribution to the subject, as well for the many facts he brings to bear upon it as for the points of view that he advances. J. J.

*The Significance of Sex.* JULIUS NELSON. The American Naturalist, Jan., Feb., March, 1887, 71 pp.

This is the first chapter of a detailed study, and presents the cytological aspects of the question. It is abundantly illustrated with karyokinetic diagrams, and has a pretty full bibliographical appendix. Sex is considered a secondary or evolved characteristic which we distinguish in the higher organisms, calling that female which produces ova, and that male which produces the spermatozoa. The reproductive cells are of one brotherhood with the other cells of the body, but are specialized in such a way that two cells from diverse individuals may fuse into one cell, which then, multiplying itself by division, builds up an organism like the parent. The offspring are sometimes not only differentiated dimorphically into the sexes, but polymorphically, as in hydroids. Many forms develop from cells that have not been fertilized; the ova of parasites are frequently parthenogenetic, and in low forms even male parthenogenesis has been observed. Still lower, the gametal cells are so similar as not to be distinguished sexually in their conjugation; and sexual generation is the exception in the lowest forms of life.

In the cell there is a substance known as *chromatin*, from its affinity for stains, which is most abundant in the nucleus, where it occurs as one or more spherical bodies, an intricately coiled filament, or as a network with coarser or finer meshes. When the cell divides, the chromatin passes through a cycle of transformations (karyokinesis), which shows that it is a very important substance. This conclusion is fully justified by all that we learn about chromatin in the different aspects of cell life. All cells while growing and multiplying possess it, and if deprived of it lose the power to regenerate lost parts. The yolk of eggs and the secretions of glands, and probably ordinary cell protoplasm, are mainly metamorphosed chromatin. In sexual fertilization, the essential phenomenon is the union of two pronuclei, one containing the chromatin of the ovum, the other that of the spermatozoan; hence the chromatin must carry the hereditary characters, and therefore has been termed the *idioplasm*. (This word implies a psychological property, the full explanation of which requires an extended article to present.) The fundamental significance of sex is therefore involved in the questions, *Why are idioplasms from two individuals of a species blended when reproduction of higher forms has place, and how are these idioplasms structurally related?* The answers are deferred until a general discussion of the theory of heredity is taken up, but provisional statements are made to the effect that a union of diverse experiences, which broadens the cell education, must be advantageous in the struggle for existence. It is assumed that the idioplasm consists of an aggregation of *similar gemmules*, each of which can reproduce itself and whose progeny can build up an organism with its characters. These characters depend on the way in which the gemmules differentiate in building up the cell in the diverse forms obtaining in a complex organism whose unity is a reflex of the gemmule unit. J. N.